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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/646,978	09/25/2000	Qinglong Hao	4296	3989

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Anderson Kill & Olick
1251 Avenue of the Americas
New York, NY 10020-1182

EXAMINER	
KOSLOW, CAROL M	
ART UNIT	PAPER NUMBER
1755	8

DATE MAILED: 10/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

T-P

Office Action Summary	Application No. 09/646,978	Applicant(s) HAO ET AL.	
	Examiner C. Melissa Koslow	Art Unit 1755	

-- The MAILING DATE of this communication appears on the cover she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 July 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

This action is in response to applicants' amendment of 26 July 2002. The objection to the disclosure with respect to how the average brightness and the standard deviation in table 1 are determined is withdrawn due to applicants' explanation. The objections to the claims, the 35 USC 112, first paragraph rejection of claim 2 and the specific 35 USC 112 second paragraph rejections over claims 2, 5 and 6 are withdrawn due to the amendment. The objection to the disclosure with respect to the description of the process is withdrawn upon further consideration. Applicant's arguments with respect to the remaining rejections and objections have been fully considered but they are not persuasive.

The substitute specification filed 26 July 2002 has not been entered because it does not conform to 37 CFR 1.125(b) because: it lacks a marked-up copy.

Royce et al, cited on the Information Disclosure Statement of 2 August 2002 has a line drawn through it since was cited by the Examiner in the action of 26 February 2002.

The disclosure is objected to because of the following informalities:

On page 1, line 28, a space should appear between "USP" and "5". On line 29 on page 1, the dot after SrO is missing from the formula. On page 2, lines 3 and 4, the period in the formulas should be dots. Also in line 4, "1.025" should not be a subscript. On page 3, line 3. "3•95" should be "3.95".

It is unclear how the two embodiments of the examples can have the same formula when each starts with different amounts of the raw materials and how the compounds of the embodiments can have different properties when they have the same formula. The specification does not teach the compositions of samples 1-5.

Page 5, lines 6 and 7 states table 1 shows the disclosed material has an afterglow time of 80 hours or more, but table 1 only measures the afterglow time from 5 second to 480 minutes or 8 hours and the showing in the table would not lead one of ordinary skill in the art to expect to the afterglow brightness to be maintained for at least an additional 72 hours, due to the rate of decrease shown. Thus table 1 does not show the disclosed material has an afterglow time of 80 hours or more. Given the teachings in table 1, there is a question if the compounds of the embodiments actually have an afterglow time of 80 and 85 hours.

The specification does not teach the ratio of $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x}$ to $(Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$ in the formula. In addition, the specification does not teach the individual amounts of B, Dy and Eu in $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x}$ nor in $(Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$. Finally, if $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x}$ and $(Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$ are the two phases in the compound, then the compound would not be expected have the taught general formula, which implies a solid solution of the given aluminates. Appropriate correction is required.

Applicants state the discussion that the invention is a composition comprising a $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x}$ phase and a $(Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$ phase on pages 2-4 clarifies how the compositions of the examples can have the same formula when the amounts of the starting materials are different. The fact the amounts of the starting materials and that the ratio of the two aluminate phases can be changed does not clarify why the compositions of the examples have the same formula. This objection is maintained.

Applicants' discussion with respect to the afterglow of their phosphor is noted, it does not overcome the object for the following reason. The phrasing the specification of "visible afterglow time was 80 hours or longer (see Table 1)" indicates to one of ordinary skill in the art

that table 1 shows the material has a visible afterglow time was 80 hours or longer. As discussed above and as admitted by applicants table 1 only shows an afterglow time of up to 8 hours. Thus due to the wording in the specification, it is unclear if "80" was a typographical error and should properly be 8. This is why the objection was made and why it is being maintained. Applicants should provide a translation of their priority document to show that "80" is correct and they should amend the specification so it no longer implies table 1 shows the material has a visible afterglow time was 80 hours or longer.

Applicants' use of the dot in the formula to separate the two phases in the material is a misuse of this symbol. A dot in a formula indicates the compounds on either side of the dot are components of a single compound, as shown by Royce et al, JP 2000-1672 and EP 877,071. Thus applicants' misuse of this symbol creates confusion as to what applicants consider as their invention. Applicants' explanations do not overcome the objections. Accordingly, the objections are maintained.

Claims 12 and 13 are objected to because of the following informalities: In claim 12, "S_r" should be "Sr" and "AO" should be "Al". In claims 13, "Eu_3+" and "Eu_2+" should be "Eu3+" and "Eu2+". Appropriate correction is required.

Claim 11, 12 and 16 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

There is no teaching in the specification that the element B exists entirely in crystalline form in both phases. Page 4, lines 6-7 of the original specification teach the element B exists in

the entire crystallization structure. This is different from what is being claimed. The claim states elemental boron exists in both phases as a separate phase, not that it is part of both phases. It is noted that claim 10 teaches the element B exists in the entire crystallization structure by requiring B in both phases.

Steps (2) and (3) of claim 12 and claim 16 are not supported by the specification. Step (2) on page 3 and the examples of the original specification teach raising the temperature from 850°C to 1000°C or 1200°C over three hours in a reducing atmosphere and then holding the temperature at 1000°C or 1200°C for 5-6 hours. The claimed process is to heat the mixture at a temperature in the range of 850-1200°C for three hours in a reducing atmosphere and then heating the body at a temperature of about 1200°C for any time, but preferably 5-6 hours. The specification does not support the claimed two step heating process, the claimed temperature range of "substantially 1200°C", which include temperatures less than and greater than 1200°C and the unlimited time range of step (3).

Claims 12-16 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for producing a light-emitting material of claim 10 by pulverizing a mixture of $SrCO_3$, Al_2O_3, H_3BO_3, Eu_2O_3 and Dy_2O_3; raising the temperature of this mixture from 850°C to 1000°C or 1200°C over three hours in a reducing atmosphere; holding the temperature at 1000°C or 1200°C for 5-6 hours to sinter the body; cooling the sintered body and pulverizing the cooled body does not reasonably provide enablement for producing any light-emitting material by pulverizing a mixture of $SrCO_3$, Al_2O_3, H_3BO_3, Eu_2O_3 and Dy_2O_3; heating the mixture at a temperature in the range of 850-1200°C for three hours in a reducing atmosphere; heating the body at a temperature of about 1200°C for any time, but preferably 5-6 hours, to sinter the body;

cooling the sintered body and pulverizing the cooled body. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Claims 10-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10 and 11 do not teach the ratio of $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x}$ to $(Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$ in the formula. In addition, the claims do not teach the individual amounts of B, Dy and Eu in $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x}$ nor in $(Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$. Without this information, one of ordinary skill in the art cannot determine what compounds applicants consider as their invention. If $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x}$ and $(Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$ are the two phases in the compound, then the compound would not be expected have the taught general formula, which implies a solid solution of the given aluminates.

Claim 12 is indefinite since it is unclear how steps 2 and 3 relate. Step 2 teaches heating the mixture at a temperature in the range of 850-1200°C for three hours in a reducing atmosphere and step 3 teaches maintaining the temperature at substantially 1200°C. There is no requirement in step 2 that the heating temperature is substantially 1200°C, thus it is unclear how the temperature of step of 2 is maintained at substantially 1200°C.

Applicants argue that one of ordinary skill in the art would be able to determine the amounts of Eu, Dy and B in each phase from the claimed average amounts since the claimed amounts are the amounts in each phase. Applicants have not provided evidence to support this assertion. Nowhere in the specification is there any indication the taught average amounts refer

to the amounts in each phase and the phrasing of the claims and specification indicate the percentages are total amounts in the material, not each phase. The rejections is maintained

Claims 10 and 11 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicants regard as their invention. Evidence that claims 10 and 11 fail to correspond in scope with that which applicants regard as the invention can be found in Paper No. 7 filed 26 July 2002. In that paper, applicant has stated the material is a composition consists of $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x}$ and $(Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$ and this statement indicates that the invention is different from what is defined in the claims because the claimed define the material as a compound having the formula $(Sr,Eu,Dy)_{0.95\pm x}(Al,B)_2O_{3.95\pm x} \bullet (Sr,Dy,Eu)_{4-x}(Al,B)_{14}O_{25-x}$.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Royce et al.

This reference teaches producing a light-emitting material by pulverizing $SrCO_3$, Al_2O_3, H_3BO_3, Eu_2O_3 and Dy_2O_3, heating the mixture at 1200-1500°C for 1-6 hours in a reducing atmosphere to sinter the mixture, cooling the resulting body and pulverizing the cooled material. Column 5, lines 59-66 teaches the europium in the material in the +2 state and thus the sintering step reduces Eu+3 in Eu_2O_3 to Eu+2.The taught temperature range overlaps and encompasses the

claimed temperatures and the taught sintering time overlaps the claimed time. Process claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The claimed process is suggested by the taught process.

Claims 12-15 are rejected under 35 U.S.C. 103(a) as being obvious over Hao et al.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

This reference teaches producing a light-emitting material by pulverizing $SrCO_3$, Al_2O_3, H_3BO_3, Eu_2O_3 and Dy_2O_3, heating the mixture at 800-1200°C for 2-5 hours in a reducing condition by burying the mixture in carbon powder to sinter the mixture, cooling the resulting body and pulverizing the cooled material. While the reference does not teach the sintering step reduces Eu+3 in Eu_2O_3 to Eu+2, one of ordinary skill in the art would know the europium activator in alkaline earth aluminate phosphors, such as that taught, has a +2 state. Thus the taught sintering step must inherently reduce Eu+3 in Eu_2O_3 to Eu+2. The taught temperature range overlaps the claimed temperatures and the taught sintering time overlaps the claimed time. Process claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The claimed process is suggested by the taught process.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Koslow whose telephone number is (703) 308-3817. The examiner can normally be reached on Monday-Friday from 8:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Bell, can be reached at (703) 308-3823.

The fax number for Amendments filed under 37 CFR 1.116 or After Final communications is (703) 872-9311. The fax number for all other official communications is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661 or (703) 308-0662.

cmk
October 18, 2002

C. Melissa Koslow
Primary Examiner
Tech. Center 1700